FACT SHEET

Nitrate and Drinking Water from Private Wells

What is nitrate?
Nitrate is a compound that is formed naturally when nitrogen combines with oxygen or ozone. Nitrogen is essential for all living things, but high levels of nitrate-nitrogen in drinking water can be dangerous to health, especially for infants and pregnant women. Nitrates are also made in large amounts by plants and animals, and are released in smoke and industrial or automotive exhaust.

How can I be exposed to nitrate?
Adults are mainly exposed to nitrate through foods. The main nitrate exposure for infants is contaminated well water used to prepare formula and other baby foods.

Where and how does nitrate get into drinking water?
Nitrate can occur naturally in surface and groundwater at a level that does not generally cause health problems. High levels of nitrate in well water often result from improper well construction, well location, overuse of chemical fertilizers, or improper disposal of human and animal waste. Sources of nitrate that can enter your well include fertilizers, septic systems, animal feedlots, industrial waste, and food processing waste.

What are the symptoms of methemoglobinemia?
Methemoglobinemia is a blood disorder caused by having too much nitrate in your body. This blood disorder has very visible signs and mainly affects infants. In babies less than 6 months of age, high levels of nitrate in the body will prevent the blood from delivering oxygen effectively to different parts of the body. As a result, the infant may have blueness around the mouth, hands, and feet (hence the name "blue baby syndrome"). This blue color does not necessarily mean that the infant is having breathing problems. However, without treatment and the removal of nitrate from drinking water, the condition could worsen and affect the baby's breathing. Other signs of blue baby syndrome include vomiting and diarrhea.

Pregnant women also do not tolerate nitrates very well. In women who are nursing their babies, nitrate can pass through the mother’s milk to her baby and affect the baby indirectly.

What should I do if I have concerns about methemoglobinemia?
See your health care provider immediately to discuss your concerns. Treatment is available.

How is methemoglobinemia diagnosed?
A simple and quick finger-prick blood test can be used to diagnose methemoglobinemia.

What is the treatment for nitrate exposure?
Changing your drinking water is usually the only treatment necessary. The new water should have less than 10 milligrams of nitrate-nitrogen per liter. Severely affected infants may need additional treatment. Consult with your health care provider.

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How do I remove nitrate from my drinking water?
Please DO NOT heat or boil your water to remove nitrate. Because some of the water will evaporate during the boiling process, the nitrate levels of water can actually increase in concentration if the water is boiled. Mechanical filters or chemical disinfection, such as chlorination, DO NOT remove nitrate from water.

Nitrate may be successfully removed from water using treatment processes such as ion exchange, distillation, and reverse osmosis. Contact your local health department for recommended procedures. For more information on treatment systems, contact NSF International, an organization for public health and safety through standards development, product certification, education, and risk management.

NSF International
3475 Plymouth Road
P.O. Box 130140
Ann Arbor, Michigan 48113-0140
Phone number: (877) 867-3435
Web site: http://www.nsf.org

For more information, visit www.cdc.gov/ncidod/healthywater

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